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By failing to consider this possibility one solution of the problem considered is lost, that is $s = \rho$, giving in the map circles of latitude passing through one point.

JAMES K. WHITTEMORE.

Lezioni di Calcolo Infinitesimale dettata nella R. Università di Bologna e redatte per uso degli studenti. S. PINCHERLE. Seconda edizione riveduta. Bologna, N. Zanichelli, 1920. 8vo. 8 + 785 pp. Price 40 lire.

Translation of an extract from the "avvertenza alla seconda edizione": "The lectures on the infinitesimal calculus which I gave to the press at the end of 1915, not without fear and trembling, have won favor, beyond all expectations, with the mathematical public, so that the call for a new edition came too soon to permit those modifications and additions that I had in mind to introduce.

"The second edition differs from the first only by slight changes, and only those parts have been retouched in which greater clarity or precision of statement seemed to me necessary."

Contents—Introduction, 1–50; Section first: Differential calculus, 51–302; Section second: Integral calculus, 303–484; Section third: Geometrical applications of infinitesimal calculus, 485–630; Section fourth: Differential equations, 631–764. There is a 14-page alphabetical index.

Leçons de Géométrie Supérieure. Par E. VESSIOT. Edition revue et augmentée. Avec une préface de M. G. Koenigs. Paris, J. Hermann, 1919. 10 + 376 pp. Price 30 francs.

Preface by E. Vessiot: "La première édition de ces leçons autographiée [1906], ayant été rapidement épuisée, j'ai accepté l'offre de réimpression que m'a faite M. Hermann. Les fautes d'impression avaient été corrigées par M. Anzemberger en vue de cette réédition. J'ai revu et amélioré la rédaction; et j'y ai fait des additions importantes. . . ."

Contents—I: Révision des points essentiels de la théorie des courbes gauches et des surfaces développables, 1–18; II: Surfaces, 19–34; III: Etude des éléments fondamentaux des courbes d'une surface, 35–60; IV: Les six invariants, La courbure totale, 61–81; V: Surfaces réglées, 82–120; VI: Congruences de droites, 121–160; VII: Congruences de normales, 161–189; VIII: Les congruences de droites et les correspondances entre deux surfaces, 190–237; IX: Les complexes de droites et les équations aux dérivées partielles du premier ordre, 238–268; X: Complexes linéaires, 269–292; XI: Transformations de contact, Transformations dualistiques, Transformations de Sophus Lie, changeant les droites en sphères, 293–315; XII: Systèmes triple orthogonaux, 316–325; XIII: Congruences de sphères et systèmes cycliques, 326–354; Exercices, 355–371.

Physical Bases of Ballistic Table Computations. Ordnance Textbook. [By Professor A. A. BENNETT.] (War Department, Document 972). Washington, Government Printing Office, 1920. 4to. 17 pp.

This monograph constitutes Part I of the Introduction of New Ballistic Tables being prepared by the Ordnance Department.

Quotation from 'Prefatory Remarks': "These new tables for exterior ballistics . . . were designed and supervised by the author of this introduction. The circumstances demanding their construction will not be reviewed in this part, nor will any account be given here of their form and content, nor of the technique and special devices used in their computation. It is only the physical facts and theories upon which these tables are founded that will here be treated, and even the history of these theories will be left with little more than mention.

"The matter treated here is qualitative rather than quantitative. The methods of numerical integration used in computing the trajectories, while in themselves only methods of approximation, are capable of giving results with any preassigned degree of accuracy, and as used yield vastly more precise figures than justified by the physical data available or the physical assumptions employed. This precision is obtained, however, at no extravagant sacrifice of labor, and secures results which are conveniently regular. Less accurate methods hitherto in vogue are now insufficient. The total number of physical factors in the problems of exterior ballistics is practically infinite. The elimination of all but a few is justified only by careful quantitative experiments and computations which are not discussed here. To catalogue and describe, merely, the various influences affecting the projectile in flight, leaves the relative importance assigned to each apparently hap-hazard and arbitrary. Thus this introduction seeks to mention only those physical assumptions which enter explicitly into the computations of the accompanying tables, and attempts only such justification for them as is in keeping with the expository nature of this paper."

Solid Geometry with Problems and Applications. Revised edition. By H. E. SLAUGHT and N. J. LENNES. Boston, 1919. 12mo. 8 + 211 pp. Price $1.00.

Quotations from the Preface: "In re-writing the *Solid Geometry* the authors have consistently carried out the distinctive features described in the preface of the *Plane Geometry*. . . . Owing to the greater maturity of the pupils it has been possible to make the logical structure of the *Solid Geometry* more prominent than in the *Plane Geometry*. The axioms are stated and applied at the precise points where they are to be used. Theorems are no longer quoted in the proofs but are only referred to by paragraph numbers; while with increasing frequency the student is left to his own devices in supplying the reasons and even in filling in the logical steps of the argument. For convenience of reference the axioms and theorems of plane geometry which are used in the Solid Geometry are collected in the Introduction.

"In order to put the essential principles of solid geometry, together with a reasonable number of applications, within limited bounds (156 pages), certain topics have been placed in an Appendix. This was done in order to provide a minimum course in convenient form for class use and not because these topics, Similarity of Solids and Applications of Projection, are regarded as of minor importance. In fact, some of the examples under these topics are among the most interesting and concrete in the text. . . .

"The treatment of incommensurables throughout the body of this text, both Plane and Solid, is believed to be sane and sensible. In each case, a frank assumption is made as to the existence of the concept in question (length of a curve, area of a surface, volume of a solid) and of its realization for all practical purposes by the approximation process. Then, for theoretical completeness, rigorous proofs of these theorems are given in Appendix III, where the theory of limits is presented in far simpler terminology than is found in current text books and in such a way as to leave nothing to be unlearned or compromised in later mathematical work."

Plane Trigonometry for Secondary Schools. By C. DAVISON. Cambridge: at the University Press, 1919. 12mo. 4 + 334 pp. Price 6 shillings and 6 pence.

Contents—I: Trigonometrical ratios of an acute angle, 1–30; II: Circular measure, 31–40; III: Circular functions of an angle of any magnitude, 41–56; IV: Graphs of the circular functions, 57–65; V: Circular functions of compound angles, 66–84; VI: Circular functions of multiple angles, 85–98; VII: Transformation of trigonometrical expressions, 99–111; VIII: Solution of trigonometrical equations, 112–141; IX: Inverse functions, 142–147; X: Circular functions of sub-multiple angles, 148–158; XI: The geometry of the triangle, 159–174; XII: The solution of triangles, 175–187; XIII: Practical applications, 188–208; XIV: The principal circles associated with a triangle, 209–223; XV: The geometry of the quadrilateral, 224–232; XVI: Areas of regular polygons and circles, 233–238; XVII: Inequalities, 239–247; XVIII: Approximations and errors, 248–256; XIX: DeMoivre's theorem, 257–274; XX: Series, 275–287; Problem papers, 288–308; Answers, 309–334.

Elementary Applied Mathematics. A practical course for general students. By W. P. WEBBER. New York, Wiley, 1920. 12mo. 10 + 115 pp. Price $1.25.

Preface: "This course is a response to a demand in this university [of Pittsburg]. It is an effort to provide a course that is complete in itself and sufficiently general and practical to meet the needs of a large class of students who are not to specialize in mathematics but who do want some elementary mathematical training that they can use in everyday affairs.